51-101R 26
451-239

forming tool. This will make three operations. The sketch shows a blank in position, on the attachment.

P. BRICKNER.

Grinding Cams.

We have a great many cams to make as shown in Fig. 1, which are of cold rolled steel, case-hardened. These cams are made in imitation of another manufacturer, and we have never, heretofore, been able to make them exact, our customers constantly complaining that our cams were not as good as the *genuine*. Seeing, then, that it was necessary to make them exact, we decided to grind them, and the rig, Fig. 2, was made to do the work on the grinder.

The drawing seems very clear; still, a word of explanation may not be unacceptable. *A* is the base, with the cam-stop *B* and the fulcrum lugs *C* cast on. *D* is the spindle carrier, which is mounted on rock shaft *E* and carries the spindle *F* at the top end. The spindle is held in position by the driving pulley *G* and the collar *H*. At *I* is the genuine cam (of which I shall have more to say later), and at *J* is the cam to be ground. *K* is the emery wheel. The lever *L*, which is secured by a headless screw to shaft *E* (to which shaft the lower end of the spindle carrier *D* is also fastened by a screw), is drawn forward by the spring *M* until the cam *I* comes in contact with the cam-stop *B*.

The cams are rough milled on the cam cutter, no particular care being taken as to their exactness, whereas heretofore every care was taken without avail; they are held in position by screws which fit in a spot on the cam cutter shaft. These screws it is necessary to have in the same position in each cam. The cams are then case-hardened and ready to be ground. On the shaft *F* are drilled two spots *N* and *O* in perfect alinement. The screw at *N* locates the model cam I, while that at *O* secures one of our own rough-milled cams to be ground.

As the pulley *G* rotates, the spindle-carrier *D* takes a rocking motion, as cam *J* is held against the stop *B* by the spring *M* and lever *L*. The cam *J* necessarily takes the same motion against the emery wheel *K*, and is ground to a perfect facsimile with a perfect surface.

Our customers are now telling us our cams are better than Blank's. You see, Blank's are not ground, and have the plain case-hardened surface, while ours are beautifully polished.

C. H. RAMSEY.

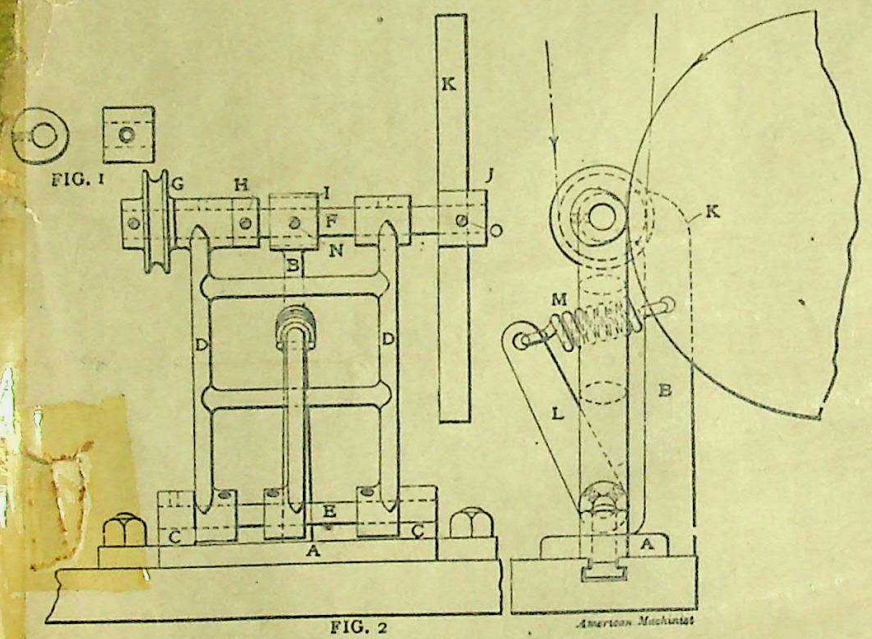

FIG. 2

CAM-GRINDING FIXTURE.

A Big Repair Afloat.

Two years ago a repair unusual in the method employed and the utilization of the ship's gear was carried out afloat in dock.

The steamer—one of a fleet of freighters employed in the China trade—was of the usual freight build, 1,800 tons register, 3,500 tons dead weight. The engines were of the ordinary inverted type, triple cylinders; high pressure, 23 inches; intermediate pressure, 47 inches; low pressure, 70 inches; and their total weight was between 80 and 90 tons. Two single-ended Scotch boilers, 15 feet 6 inches diameter, 11 feet long, weighing 20 tons each, were the equipment for steam raising.

Upon survey, the ballast bank under the engine and boiler room was condemned by the insurance surveyor and the owners advised to replace it. The superintendent of the line decided that the engines were not to be dismantled. Several methods of doing the job were discussed, but the following was carried through:

The principal appliances used were a large pair of three- and four-sheaved blocks, used with a luff tackle of three hanged wheels; [illegible] way; and finally, a pair of 50-ton h lic jacks.

The ship's donkey boiler was to the deck and connected to th steam service, to run the winche dynamo. The whole of the pipes— auxiliary-steam, feed, exhaust and were disconnected, labelled and put the after hold. This was no smal ter. The whole of them were used and brought up when wanted.

The bulkhead between the fo holds was strengthened by bars and blocks. The cross bunker betwee boiler room and the hold was taken in sections and marked for replace this gave a clear road into the forel

The beam between the engine boilers consisted of a plate in two and four angles riveted together stringers on the ship's side prevente from being moved bodily, so the were knocked out, the plates taken and a furnace used to heat and bo angles. These were afterwards re a good job being made, considerin means used. Meanwhile, the engine ing down bolts were knocked into the tank. The gratings wer nected and the shaft coupling bo out, so that all was clear for shifti

The seats of the boilers w down, one boiler at a time, the o being placed under the boiler a runway. The tackle was rigg the strengthened bulkhead, a made in the tail of the fall to lower block of the luff tackle i the end of the luff tackle was t through the block on the fore down into the winch barrel. Steam the donkey boiler was used. The were in this manner run as far A as possible.

The engines having been lifted jacks, the fitting pieces were re and the boiler tubes placed unde framing. The tackle was rigged this time to the forward end of th gines; these were run forward jus der the main hatch. The complete ing took two days. In the position occupied the engines were accessibl a complete and thorough overhaul, they received.

The tank was in a very bad cond the whole of the floors, etc., excep top plates under the engine seating to be renewed. The corrosion caus the alternate wet and dry spells, in junction with the boiler heat, being cause.

The tip forward given to the the position of the engines enable tail shaft to be withdraw

August 24, 1905
American Machinist